

S p e c i f i c a t i o n

Be It Known That I, **JASON P. JANAVICIUS** a citizen of the United States of America, resident of San Diego, County of San Diego, State of California, have invented a new and useful

ANTI-CLOGGING PAINTBALL FIRING MECHANISM

of which the following is a specification:

Field of the Invention

This invention relates to compressed gas firing mechanisms and more specifically to firing mechanisms used in connection with paintball guns.

Background of the Invention

In a paintball gun, projectiles are admitted into a gun barrel from a magazine through a radial hole in the upper region of the barrel. Compressed air is then delivered between the breech of the gun and the projectile, and the expansion of the gas propels the paintball down the gun barrel. The alternate opening of the paintball entry port and the gas admitting port is controlled by a bolt assembly that, in a recoiled position, allows a paintball to drop into the gun barrel and in a firing position move that paintball forward and closes the paintball admitting port while at the same time opening the gas delivery port. The envelope of a paintball is commonly made of soft, pliable material that can be easily torn. When a paintball is jammed into the gun barrel or is only partially passed through the paintball admitting port, the bolt tends to chop or crush the paintball smearing viscous paint inside the firing mechanism and rendering the gun inoperable until it has been thoroughly cleaned.

The prior art had produced some anti-chopping bolt assemblies that are built within the bolt and require actuation through some radially moving parts. The

complexity of the anti-chopping and crushing mechanism of the prior art tends to reduce gun reliability. Moreover, the axial unbalance of the mechanism tends to increase wear and affect the life of the gun.

This invention results from an attempt to devise a simple, reliable and balanced mechanism for avoiding chopping or crushing a jammed paintball.

Summary of the Invention

The principal and secondary objects of this invention are to provide a simple, reliable and balanced mechanism for preventing discharge of compressed gas into a gun barrel behind a projectile that is jammed and to prevent the chopping or crushing of that projectile by the firing mechanism bolt, while at the same time facilitating and speeding the automatic recoiling of the bolt in order to create a more rapid and smoother automatic firing sequence.

These and other objects of this invention are achieved by using a bolt having an internal channel starting at a radial port in the proximal part of the bolt and going through a 90 degree elbow into an axial channel leading to a discharge port at the distal, leading edge of the bolt. A sleeve slidably engaged over the bolt has a radial aperture which is resiliently biased in line with the entrance port of the bolt but can slide rearwardly against a spring so that the aperture is no longer in line with the bolt channel port when its leading edge contacts a jammed projectile.

The pressure imparted against the elbowed section of the bolt channel by the expanding gas accelerates the recoil of the bolt and sleeve mechanism to allow faster multi-firing sequences.

Brief Description of the Drawing

Figure 1 is a side view of the paintball firing mechanism;

Figure 2 is a side view of the sleeve and bolt assembly in its fully extended mode;

Figure 3 is a side view of the sleeve and bolt assembly in the compressed mode; and

Figure 4 is an exploded view of the bolt assembly.

Description of the Preferred Embodiment of the Invention

The preferred embodiment of the invention is described in connection with a paintball firing mechanism. It should be understood that the invention is equally applicable to other types of compressed gas firing systems.

Referring now to Figure 1, there is shown the firing mechanism 1 of a paintball gun in the firing position. The mechanism comprises a gun barrel 2 of which a first portion 3 has a radial first port 4 admitting paintballs from an inlet 5 connected to a paintball magazine not shown on the drawing.

In a second portion 6 of the gun barrel located rearwardly from the first portion, a second radial port 7

admits compressed gas fed from source 8 such as a a gas cartridge. A bolt assembly 9 is translated axially across the first and second portions of the gun barrel to alternately control the admission of paintballs through the first port or the admission of compressed gas through the second port.

As more specifically illustrated in Figures 2 and 3, the bolt assembly 9 comprises a sleeve 10 having an outer cross-section commensurate with the caliber of the gun barrel. The sleeve comprises a leading portion 11, and a trailing portion 12. The trailing portion has a radial aperture 13. A bolt 14 is engaged into the sleeve. The outer radius of the bolt is slidably commensurate with the internal radius of the sleeve so that the sleeve can intimately slide over the bolt. A radial intake port 15 in a proximal section of the bolt leads to a gas discharge channel comprising a rounded elbow zone 16 and an axial channel zone 17 leading to an axial discharge port 18. An axle 19 projects rearwardly and axially from the proximal end of the bolt and is connected to a barrier block 20, a compression spring 21 engaged over the axle between the bolt and the barrier block biases the sleeve 10 into a firing position where the intake port 15 of the bolt and the aperture 13 of the sleeve are lined up.

As shown in Figure 1, a strip pin 22 radially connects the barrier block 20 of the bolt to a trigger mechanism 23. The trigger mechanism can translate the bolt assembly 9 from

a recoil position where the sleeve 10 clears the first port of the gun barrel to admit a projectile into the first portion 3 of the gun barrel, to a firing position where the first port is occluded by the sleeve while the sleeve aperture 13 and the intake port 15 line up with the second port 7 to admit gas into the channel of the bolt. Any projectile 24, whose radius is approximately commensurate with the inner radius of the sleeve and the outer radius of the bolt, is engaged by the sleeve then propelled down the barrel under the expansion of the gas coming through the bolt channel.

The pressure exerted by the gas expansion against the elbow zone 16 of the bolt channel helps the bolt assembly to recoil backward toward its initial position.

The spring 21 is stiff enough to maintain the alignment of the sleeve aperture 13 with the bolt intake port 15 during normal operation.

When the leading edge of the sleeve 10 contacts an obstacle such as a projectile that is only partially engaged through the first port 4, the sleeve slides back against the spring 21 toward the barrier block 20 causing a misalignment of the aperture 13 and the intake port 15 as illustrated in Figure 3. Accordingly, the gas admitting port 7 remains closed preventing gas from expanding into the bolt channel and firing or breaking the projectile.

An axial slot 25 in the trailing portion of the sleeve is engaged by a nib 26 projecting radially from the axle 19

in order to prevent rotational movement of the sleeve in relation to the bolt.

While the preferred embodiment of the invention has been described, modifications can be made and other embodiments may be devised without departing from the spirit of the invention and the scope of the appended claims.

WHAT IS CLAIMED IS: